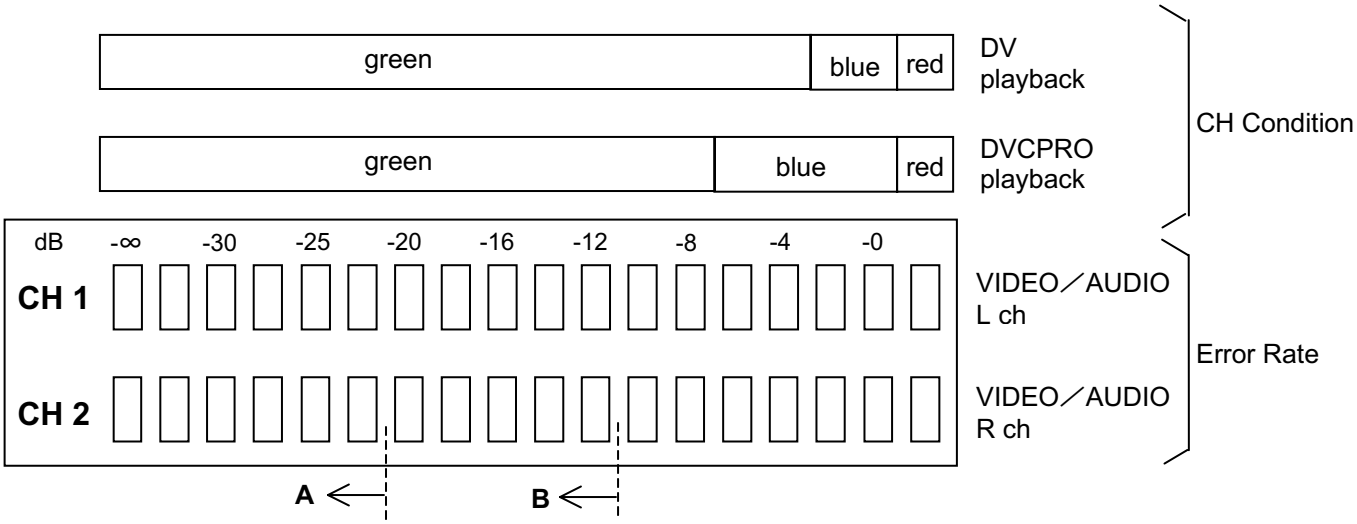
1. ERROR RATE DISPLAY PROCEDURE

The error rate is displayed on the AUDIO LEVEL METER in Service menu mode.
(When enters in Service men mode, the AUDIO LEVEL METER changes into the error display mode automatically.)



When “CH1” lamp of AUDIO LEVEL METER lights :

The upper portion of Level Meter shows the error rate of “AUDIO Lch”.

The lower portion of Level Meter shows the error rate of “AUDIO Rch”.

When “CH2” lamp of AUDIO LEVEL METER lights :

The upper portion of Level Meter shows the error rate of “VIDEO Lch”.

The lower portion of Level Meter shows the error rate of “VIDEO Rch”.

Switching between AUDIO error mode and VIDEO error mode is enable by pressing the DIAG button in the pocket of front panel.

Set the item on EQ ADJUST menu as shown below

MENU		DVC PRO (PB)	DV (R/P)
C22	ECC MODE	AL OFF	AL OFF
C23	CONCEALMODE	AFF	OFF
C24	VITABI MODE	AUTO	ON
C25	PB MODE	PB H	RP H
C26	ERROR MODE	SLOW	SLOW

Note: With above contents set automatically, when set the error rate display mode during normal operation.

※ Please refer to condition of the error rate follow the tape format and VTR mode, indicated as below.

	VTR mode	Standard of Error Rate
DVCPRO (PB)	Alignment tape playback	Under the “A” position at level meter
DV (R/P)	Alignment tape playback	Under the “B” position at level meter

2. Service Menu Information

< Operation Procedure >

(1) The “REMOTE/LOCAL” switch set to “LOCAL” on the front panel.
(2) Press the MENU button, then the Set up menu on the TV monitor.
(3) Keep holding press the EJECT button and STOP button, press the MENU button, then appeared Main menu of Service menu on the screen as indicated as below.

SERVICE-MENU
No. A00

＊ A00 : SERVO ADJUST
B00 : EQ ADJUST
C00 : RF ADJUST
D00 : VIDEO ADJUST
E00 : AUDIO ADJUST
F00 : BACKUP RAM INIT
END

MAIN Menu

(4) Move the star mark “＊” by “▼” or ”▲” button on the front panel for select the each Adjustment menu.
(5) Press the SET button, then open the Adjustment Menu follow the selected item (A00 to H00) on the Main menu.
(6) Each Adjustment item are selected by. “▼” or ”▲” button.
(7) For change the value or setting, press the “◀ ” or ” ▶” button.(same way of SET UP menu).

< KEY function for Service Menu >

[MENU button] : ①. Keep pressing EJECT and STOP button, press MENU button, then move to Main menu on Service menu from SET UP menu.
②. Move to Main menu from ADJUST menu on the Service menu
③. Move to SET UP menu from Main menu on Service menu.
[SET button] : ①. Move to ADJUST menu from Main menu on Service menu.
[▲] : ①. Move the cursor “＊” for select the each item (cursor move to up direction).
[▼] : ①. Move the cursor “＊” for select the each item (cursor move to down direction).
[◀] : ①. Change the numerical value or setting value of each item on ADJUST menu. (decrease adjustment value)
[▶] ①. Change the numerical value or setting value of each item on ADJUST menu. (Increase adjustment value)

< Store the adjustment and setting value to the memory >

When menu is escape from Adjustment menu to Main menu by press MENU button, each data write to the memory.

The contents of each “Adjustment menu” which are described on behind page.

Press the MENU button on the Main menu condition, then escape from Service menu mode.

A00:SERVO ADJUST

No.	ITEM	SETTING VALUE	CONTENTS OF SETTING and ADJUSTMENT	REMARK
A01	PG SHIFTER	0～**1649**～4095 0～**1649**～4095	(RISE display) PG SHIFTER AUTO ADJ (FALL display).	Elec. Adj
A02	T TORQUE	-128～**0**～+127 Initial:0	Correct the offset value of T REEL MOTER DRIVE	Elec. Adj
A03	S TORQUE	-128～**0**～+127 Initial:0	Correct the offset value of S REEL MOTER DRIVE	Elec. Adj
A04	PB GAIN P	-128～**-1**～+127	LISTA SENSITIVITY Adj.（PB HEAD）	LISTA
A05	PB LINEAR P	0 1 ON	LISTA LINEARITY Adj. （PB HEAD）	LISTA
A06	RP GAIN P	-128～**-1**～+127	LISTA SENSITIVITY Adj.（R/P HEAD）	LISTA
A07	RP LINEAR P	0 1 ON	LISTA LINEARITY Adj. （R/P HEAD）	LISTA
A08	RP GAIN	-128～**-1**～+127	LISTA CONSUMER DV COMPATIBILITY CONFIRMATION	LISTA
A09	RP LINEAR	0 1 ON	LISTA CONSUMER DV LINEARITY Adj.	LISTA
A10	MOTOR CHECK	0 OFF 1 CAP 2 DRUM 3 T REEL 4 S REEL		* NOT USED

B00:EQ ADJUST

Note: The mark "●" indicated as common adjustment item for DVCPRO and DV.

NO	ITEM	SETTING VALUE	CONTENTS OF SETTING and ADJUSTMENT	REMARK
B01	PB PLL PHASE	-128～**-40**～+127	PB PLL PHASE Adj. ●	Elec. Adj
B02	PB PLL SLICE	-128～**-70**～+127	PB PLL SLICE LEVEL Adj. ●	Elec. Adj
B03	PB AEQ	-128～**+75**～+127	PB AUTO EQ Adj. ●	Elec. Adj
B04	PB GAIN L	-128～**+30**～+127	PB Lch EQ GAIN Adj. ●	Elec. Adj
B05	PB PHASE L	-128～**-55**～+127	PB Lch EQ PHASE Adj. ●	Elec. Adj
B06	PB GAIN R	-128～**+30**～+127	PB Rch EQ GAIN Adj. ●	Elec. Adj
B07	PB PHASE R	-128～**-55**～+127	PB Rch EQ PHASE Adj. ●	Elec. Adj
B08	RP PLL PHASE	-128～**+50**～+127	RP PLL PHASE Adj.	Elec. Adj
B09	RP PLL SLICE	-128～**-70**～+127	RP PLL SLICE LEVEL Adj.	Elec. Adj
B10	RP AEQ	-128～**+75**～+127	RP AUTO EQ Adj.	Elec. Adj
B11	RP GAIN L	-128～**+30**～+127	RP Lch EQ GAIN Adj.	Elec. Adj
B12	RP PHASE L	-128～**-55**～+127	RP Lch EQ PHASE Adj.	Elec. Adj
B13	RP GAIN R	-128～**+30**～+127	RP Rch EQ GAIN Adj.	Elec. Adj
B14	RP PHASE R	-128～**-55**～+127	RP Rch EQ PHASE Adj.	Elec. Adj
B15	VTB PHASE 1	-128　+127	VITABI A/D CLOCK PHASE Adj.（LSB）	
B16	VTB PHASE 2	-128　+127	VITABI A/D CLOCK PHASE Adj.	
B17	VTB PHASE 3	-128　+127	VITABI A/D CLOCK PHASE Adj.（MSB）	
B18	VTB PHS FINE	-128～**-1**～+127	VITABI A/D CLOCK PHASE ADJ.（FINE Adj.）	
B19	PB MAIN DL	-128～**-40**～+127	PB EQ DELAY LINE Adj. ●	Elec. Adj
B20	RP MAIN DL	-128～**-40**～+127	RP EQ DELAY LINE Adj.	Elec. Adj
B21	PB PLL VCO	-128～**+66**～+127	PB PLL VCO Adj.	
B22	RP PLL VCO	-128～**+66**～+127	RP PLL VCO Adj.	
B23	VTB GAIN	-31～**-15**～+32	VITABI A/D INPUT LEVEL Adj. ●	Elec. Adj
B24	ECC MODE	0　ALL ON 1　OT OFF 2　AL OFF	ERROR CORRECTION　INNER ON/OUTER ON ERROR CORRECTION　INNER ON/OUTER OFF ERROR CORRECTION　INNER OFF/OUTER OFF	
B25	CONCEAL MODE	0　ON 1　OFF	ERROR CONCEALMENT ON ERROR CONCEALEMENT OFF ※This CONCEAL MODE function is only effective, when the above ECC MODE set to "ALL ON".	
B26	VITABI MODE	0　AUTO 1　ON	VITABI ON VITABI ON	

		2 OFF	VITABI OFF	
B27	PB MODE	0 PB H	FORCED PB HEAD PLAYBACK	
		1 RP H	FORCED RP HEAD PLAYBACK	
B28	ERROR MODE	0 FAST	ERROR DISPLAY MODE “FAST”	
		1 SLOW	ERROR DISPLAY MODE “SLOW”	
B29	EQ AUTO ADJ	0 STOP		*NOT USED
		1 START	PB EQUALIZER AUTO Adj.	
B30	DEFAUT	0 LOAD	LOAD THE FACTORY ADJUSTMENT VALUE	
		1 SAVE	SAVE THE ADJUSTMENT VALUE	

「 How to LOAD or SAVE the adjustment value 」

NOTE: This item (B30) is only active on the tape pass condition.

1. Press the SET button , the appear the message as indicated as below.

   ＊SAVE

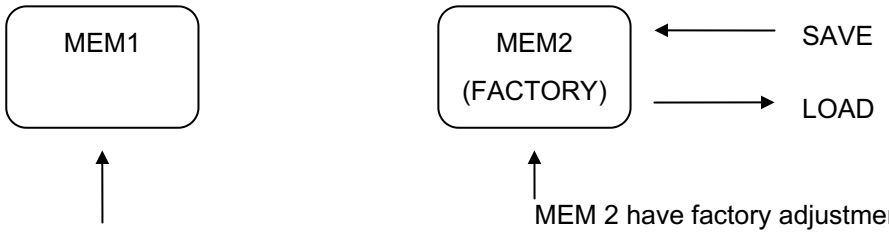
   LOAD

   END

2. Set the cursor “＊” to SAVE or LOAD and press the SET button, then execute the program.

   If cancel default screen without execute SAVE or LOAD operation, press menu button.

NOTE: 1. The VTR have two memory area for the adjustment value as indicated as below.



MEM1 is always renewed follow the adjustment value on the RF and EQ adjustment menu.

2. We recommended the SAVE function does not use on the market, because the renewed adjustment value is stored to MEM 1 automatically.

C00:RF ADJUST

NO	ITEM	SETTING VALUE	CONTENTS OF SETTING and ADJUSTMENT	REMARK
C01	REC CURR L	-128～**0**～+127	SETTING OF REC CURR （RP Lch）	Elec. Adj
C02	REC FREQ L	-128～**0**～+127	SETTING OF REC FREQ （RP Lch）	Elec. Adj
C03	REC CURR R	-128～**0**～+127	SETTING OF REC CURR （RP Rch）	Elec. Adj
C04	REC FREQ R	-128～**0**～+127	SETTING OF REC FREQ （RP Rch）	Elec. Adj
C05	RE CURR L	-128～**0**～+127	SETTING OF ERASE CURR （RE Lch）	Elec. Adj
C06	RE CURR R	-128～**0**～+127	SETTING OF ERASE CURR （RE Rch）	Elec. Adj
C07	RP PHASE L	-128～**0**～+127	RP Lch PLAYBACK PHASE CORRECTION	
C08	RP PHASE R	-128～**0**～+127	RP Rch PLAYBACK PHASE CORRECTION	
C09	RP MAG L	-128～**0**～+127	RP Lch PLAYBACK OUTPUT GAIN CORRECTION	
C10	RP MAG R	-128～**0**～+127	RP Rch PLAYBACK OUTPUT GAIN CORRECTION	
C11	PB PHASE L	-128～**0**～+127	PB Lch PLAYBACK PHASE CORRECTION	
C12	PB PHASE R	-128～**0**～+127	PB Rch PLAYBACK PHASE CORRECTION	
C13	PB MAG L	-128～**0**～+127	PB Lch PLAYBACK OUTPUT GAIN CORRECTION	
C14	PB MAG R	-128～**0**～+127	PB Rch PLAYBACK OUTPUT GAIN CORRECTION	
C15	REC SIG	0 NORMAL 1 CW		* NOT USED
C16	ECC MODE	0 ALL ON 1 OT OFF 2 AL OFF		
C17	CONCEAL MODE	0 ON 1 OFF		
C18	VITERBI MODE	0 AUTO 1 ON 2 OFF		
C19	PB MODE	0 PB H 1 RP H		
C20	ERROR MODE	0 FAST 1 SLOW	ERROR RATE INDICATION FAST ERROR RATE INDICATION SLOW	
C21	TRACKING MOD	0 ATF 1 CTL	SELECTION OF TRACKING CONTROL MODE ＊ This function is only active on the service Menu mode.	
C22	TRACKING VAL	-128～**0**～+127 Initial: 0	" IN CASE OF SELECT THE CTL MODE ON ABOVE ITEM C20, TRACKING VALUE IS ADJUSTABLE" ＊ TRACKING VALUE RANGE DATA 0 - 116 : RELATIVE TO 1 TRACK THEREFORE 0 TO 127 IS RELATIVE TO JUST OVER 18 um	
C23	REC OPTIMAIZ	0 STOP 1 START		* NOT USED
C24	DEFAUT	0 LOAD 1 SAVE	LOAD THE FACTORY ADJUSTMENT VALUE SAVE THE ADJUSTMENT VALUE	

D00:VIDEO ADJUST

NO	ITEM	SETTING VALUE	CONTENTS OF SETTING and ADJUSTMENT	REMARK
D01	VIDEO BLANK	0 NORMAL 1 OFF	NORMAL : The video signal is blanked at video edge portion for protect the overshoot. OFF : Release the blanking function.	ELEC. ADJ.
D02	V IN PLL	0 OFF 1 ON		*AJ-450 only
D03	VIDEO MUTE	0 NORMAL 1 MUTE		
D04	SELF DUB GEN	0 OFF 1 3RD 2 10TH		*AJ-D450 only * NOT USED
D05	DUBBING MODE	0 FREEZE 1 REPEAT		*AJ-D450 only * NOT USED
D06	EE TEST MODE	0 NORMAL 1 DCI RT		*AJ-D450 only
D07	HEAD SELECT	0 PB. REC 1 PB 2 REC. PB 3 REC	PRIOR TO PB HEAD FORCED PB HEAD PRIOR TO REC HEAD FORCED REC HEAD	
D08	V SETUP	0 OFF 1 ON	VALID / INVALID SELECTION FOR SETUP MENU 613 : VIN SETUP AND 614 : VOUT SETUP 0 : SETUP MENU 613/614 NO DISPLAY 1 : SETUP MENU 613/614 DISPLAY	*AJ-D450 only =NTSC ONLY=
D12	VLOCK DET	0 OFF 1 ON	SET THE MUTE FUNCTION OPERATED OR NOT, WHEN VIDEO INPUT SIGNAL IS BECOME ABNORMAL. 0 : MUTE IS NOT OPERATED 1 : MUTE IS OPERATED	*AJ-D450 only =NTSC ONLY=

E00:AUDIO ADJUST

NO.	ITEM	SETTING VALUE	CONTENTS OF SETTING and ADJUSTMENT	REMARK
E01	MASTER REF	0 FS-20 1 FS-18	Select the position of " Reference level marker " on the Audio level Meter (CH1, CH2, CUE). 0: Set to -20dB position (For NTSC) 1: Set to -18dB position (For PAL)	
E04	LINE OUT CUE	0 OFF 1 ON	SELECT THE CUE AUDIO SIGNAL OUTPUT FROM LINE OUT TERMINAL(CH1/CH2) COMPULSORY. 0: NORMAL MODE SELECTION OF AUDIO OUTPUT SIGNAL (PCM OR CUE) BY SET UP MEMU(721:LINE CH SEL). 1: CUE SIGNAL OUTPUT	

3. HOW TO RESET THE HOUR METER

(1) When the DIAG button is pressed, VTR information is displayed. When DIAG button is pressed again, the original display is restored.
(2) There are two type of information : “HOUR METER” information and “WARNNING” information. Switching between these type is enabled by pressing cursor buttons (◀) and (▶).
(3) Indicated on the “HOUR METER” screen are the power on time (OPERATION), drum rotation time (DRUM RUN), tape travel time(TAPE RUN), loading count (THREADING). The HOUR METER information appear on the screen as indicated as below.

DIAG-MENU HOUR METER

∗	**H00 : OPERATION**	**200H**
	H01 : DRUM RUN	**50H**
	H02 : TAPE RUN	**30H**
	H03 : THERADING	**100T**
	H11 : DRUM RUN r	**50H**
	H12 : TAPE RUN r	**30H**
	H13 : THERADING r	**100T**

≪How to Reset≫

DRUM RUN, TAPE RUN and THREADING information can be reset individually.

(1) Set the Dip SW501-1 on the SYSCON(F2) P.C.Board to ON position.
(2) In EJECT mode, set the cursor “∗” to the indicated “r” mark item(item 11,12 or 13) by pressing the cursor buttons (▲ or ▼). And press “RESET” button, then the following message appears on the screen.

HOURS METER INIT SET

DRUM RUN r OK?
YES <PLAY> NO <STOP>

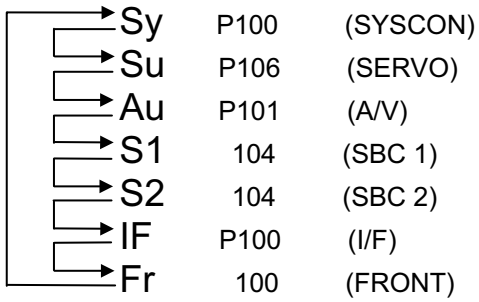
- When press the “PLAY” button, then execute the reset function.
- When press the “STOP” button, then cancel the reset command.

4. HOW TO CONFIRM THE SOFTWARE VERSION

1. Turn on the power.
2. Press the EJECT button.
3. Press the PLAY and STOP button simultaneously, then displayed the soft version on the counter display of the front panel.

   <example> **Fr** **P100**

4. Press the PLAY and STOP button repeatedly, change the display of all soft version in order as indicated as below.



ROM location indicated as below table

Name	Reference number and Board
SYSCON	IC2 (SYSCON Board)
SERVO	IC235 (SERVO Board)
A/V	IC702 (A/V Board)
SBC 1	IC870 (REC PB Board)
SBC 2	IC910 (REC PB Board)
I/F	IC503 (SYSCON Board)
FRONT	IC2 (FRONT CPU Board)

5. Replacement Procedure of the P. C. Board

Please refer to below table, It indicated as which board is necessary adjustment after board exchanged. And perform the adjustment follow the adjustment procedure on this manual.

	Board	Adj.		Board	Adj.		Board	Adj.
F1	SERVO	○	F5	REC PB	○	H2	CUE	○
F2	SYSCON	○	F6	✱V IN	○	H3	EQ	○
F3	SIF(Option)	----	F7	A PROC	×	H4	RF AMP	○
F4	V OUT	○	F8	ADDA	○	----	HEAD BUFF	×

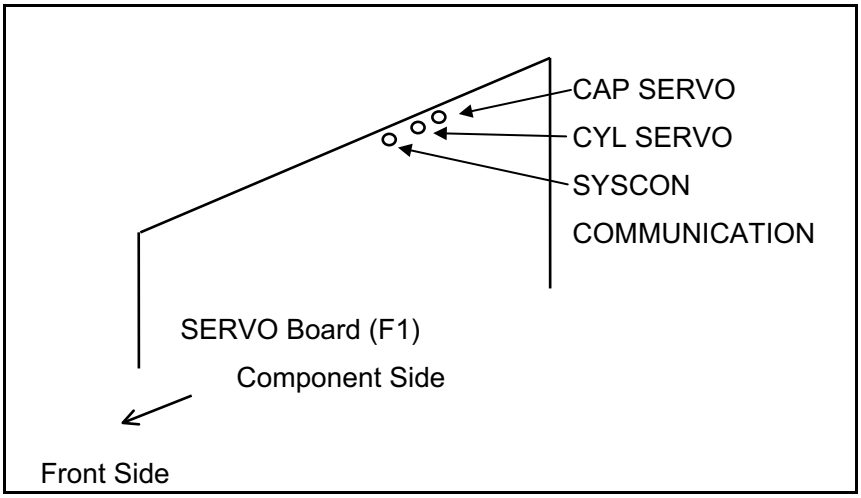
✱ **NOTE:** AJ-D450 only

1. If there is a ROM on P.C.Board, please confirm the software version. Refer to confirmation procedure of software version on previous page.
2. The DATA RAM(IC17) is installed on SYSCON Board and it data can not saved to other equipment.. When SYSCON Board exchanged, remove the IC17 on original Board and put it to New Board. Another way of move the data, write down all of User data, Service data and numerical value of Hour Meter and input the data to new RAM. But numerical value of Hour Meter can not input to VTR (Hour Meter information will be reset).

6. SERVO LED INFORMATION

SERVO LED light on Front Panel, when Cylinder and Capstan Servo are locked. In case of SERVO LED does not light on PLAY or REC condition, please check at LED condition on Servo P.C.Board for confirm the which Servo is faulty.

There are condition LED on the SERVO Board (F1) as follows.



- The LED nearest to front side light up, when Syscon CPU and SERVO CPU communication is correct.
- The center LED light up, when the cylinder servo is locked.
- The LED nearest to the Jack Board light up, when the capstan servo is locked.

Note: In case of capstan servo does not locked, please use function of Tracking mode selection on Service menu for confirm which servo is fault ATF or CTL.

7. Auto Off Error Message

In case of AUTO OFF Error is occurred, error number flashed on counter display of front panel and error message appear on the monitor screen(superimpose on VIDEO 3 OUT).

The number of below table indicates as priority display of error number and message, when some error occurred at the same time. Error message indicates under error number on below table.

No.	Display (20 characters)	Contents	VTR Operation	Detection Place	Reset Condition
1	Normal (EJECT)	After a cassette insertion, if cassette does not down within 6 seconds, VTR goes to EJECT mode.	EJECT	SYSCON	---
	E-29 (FRONT LOAD MOTOR)	After EJECT mode, if a cassette does not up within 6 seconds, error number flashed.	STOP	SYSCON	POWER OFF → ON
2	Normal (EJECT)	Loading is not completed within 6 seconds, VTR goes to EJECT mode (unloading mode).	EJECT	SYSCON	---
	E-31 (LOADING MOTOR)	When unloading is not completed within 6 seconds, error number flashed.	STOP	SYSCON	POWER OFF → ON
3	E-35 (SERVO CONTORL ERR)	If servo CPU does not respond within 1 seconds, error number flashed. <Actual Judgment> System control circuit sends COMM_TEST signal to Servo circuit and Servo circuit returns COMM_TEST_RET signal. If this signal is not returned within 1 seconds, “AUTO OFF” process is produced and Servo is reset for 50 ms.	STOP	SYSCON	POWER OFF → ON
4	E-36 (SERVO ERROR)	If only the Servo CPU perform reset operation by momentary power off, “AUTO OFF” occurred and error number flashed.	STOP	SYSCON	POWER OFF → ON

5	E-37 (SERVO COMM ERROR)	If Servo CPU does not response to command from SYSCON CPU during 10 second error number flashed.	STOP	SYSCON	POWER OFF → ON
6	E-51 (FRONT LOAD ERROR)	If Supply Reel Table rotated over time at Tape big./ end detected operation during Front loading, error number flashed.	STOP	SERVO	POWER OFF → ON
7	E-52 (W-UP REEL NOT ROTA)	When Capstan shaft send the tape 3 cm, Take-up reel FG count number is less than regulation value.	STOP	SERVO	POWER OFF → ON
8	E-53 (WINDUP ERROR)	Compare the tape movement between take up and supply reel, and if the difference is more than 2 cm, goes to “AUTO OFF” mode.	STOP	SERVO	POWER OFF → ON
10	E-55 (UNLOAD ERROR)	Reel does not wind the tape in the unloading mode. Reel FG is counted in each mechanism mode.	STOP	SERVO	POWER OFF → ON
12	E-57 (S-FF/REW TIME/OVER)	Reel operation does not finish at Tape beginning and end position.	STOP	SERVO	POWER OFF → ON
14	E-59 (DRUM ROTATE TOO SLOW)	Cylinder rotary speed is too slow. In the cylinder on mode, cylinder PG interval is more than 1.5 ms for 5 seconds or cylinder PG is not detected for 1 seconds.	STOP	SERVO	POWER OFF → ON
15	E-60 (DRUM ROTAE TOO FAST)	Cylinder rotary speed is too fast. PG interval is less than 3 ms for 2 seconds.	STOP	SERVO	POWER OFF → ON
16	E-61 (CAP ROTATE TOO SLOW)	Capstan rotary speed is too slow. In the capstan on mode, capstan FG is not detected for 5 seconds.	STOP	SERVO	POWER OFF → ON

19	E-64 (S REEL ROTATE TOO FAST)	S-REEL Rotation speed became too high more than 2 seconds.	STOP	SERVO	POWER OFF → ON
22	E-67 (T-REEL ROTA TOO FAST)	T-REEL Rotation speed became too high more than 2 seconds.	STOP	SERVO	POWER OFF → ON
24	E-69 (T-REEL TORQUE ERROR)	In the Reel mode, exceed reel torque, caused by tape run over load, is detected. If the T Reel Torque error voltage is more than 0.5V continuously, goes to Auto Off mode within 105 seconds.	STOP	SERVO	POWER OFF → ON
25	E-70 (S-REEL TORQUE ERROR)	In the Reel mode, exceed reel torque, caused by tape run over load, is detected. If the S Reel Torque error voltage is more than 0.5V continuously, goes to Auto off mode within 105 seconds or Over current flow to Reel Motor more than 0.55A for 2 seconds.	STOP	SERVO	POWER OFF → ON
26	E-71 (CAP TENSION ERROR)	Tension error is detected in capstan mode. Tension sensor voltage (SERVO : TP201) is more than 4.7 V or less than 0.3 V for 2 seconds.	STOP	SERVO	POWER OFF → ON
27	E-72 (REEL TENSION ERROR)	Tension error is detected in Reel mode. Tension sensor voltage (SERVO : TP201) is more than 4.7 V or less than 0.3 V for 2 seconds.	STOP	SERVO	POWER OFF → ON
28	E-73 (REEL DIR UNMATCH)	Take up Reel direction error is detected. Rotation of Take-up reel in opposite direction has continued through complete turn except speed 0 (stop)	STOP	SERVO	POWER OFF → ON

40	E-20 (DEW)	If the condensation has formed inside the VTR, error number flushed, then VTR goes to Eject mode. <Reset Condition> After the cassette is ejected, Drum rotated to dry out the condensation. When condensation has been removed, message is cleaned and normal operation is enable. NOTE: 1) Drum rotated, when the condensation is detected inside the VTR. 2) If the condensation is detected, when insert the cassette to VTR.	EJECT	SYSCON	AFTER CONDEN-SATION is REMO-VED Refer to CON-TENTS
41	E-FF (E-FF)	The tape beginning and end position are detected simultaneously during loading or after loading completed mode.	STOP	SYSCON	POWER OFF → ON

※ Other Operation.

1) If the Reel Base unit does not move to prescribed position within 3 seconds, Reel Motor goes to stop and the cassette is ejected.

8. AUTO OFF Check Point Table

Message	Check Point	
WINDUP_REEL_NOT_ROTA	Check the loosen of the tape before power on. ● S Reel side before capstan motor → S Reel side is abnormal at REV mode. ● T Reel side after capstan motor → T Reel side is abnormal at FWD mode	1. Check the dead point of Reel Motor in the Reel Torque Offset Adjustment mode (Service menu mode). [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Check Servo board Motor Drive circuit (F1 board) TRH±1,2,3, SHR±1,2,3--- Fig. 1 TRM1,2,3, SRM1,2,3 --Fig. 2 ● Check Reel Motor Replace Reel Motor 2. Check Reel Brake Solenoid (Check the Reel Brake is smoothly released in the Reel Torque Offset Adjustment mode.) [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Check System Control board (F2 board) Solenoid Drive circuit S_BRAKE_N, T_BRAKE_N --- Fig. 3 3. Grease is not attached on the tape pass.

WINDUP_ERROR		1. Check the tension is normal. ● Check Spring power --- Refer to the specification of Tension Regulator Spring Adjustment ● Check Tension Voltage --- Refer to the Tension Voltage Check 1 Refer to the Tension Control Check. 2. Check the FG waveform is normal. Capstan FG --- Refer to Capstan FG Check 1 and Capstan FG Check 2 Reel FG --- Refer to Reel FG Check 1 and Reel FG Check 2 3. Check Reel Offset Torque --- Refer to Motor Torque Offset Adjustment. 4. Check Tape Pass Load 5. Check Tape Damage

UNLOAD_ERROR	Check the tape is surely wound.	1. Check dead point of Reel Motor in the Reel Torque Offset Adjustment mode (Service menu mode). [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board Check Motor Drive circuit (F1 board) TRH±1,2,3, SHR±1,2,3--- Fig. 1 TRM1,2,3, SRM1,2,3 --Fig. 2 ● Check Reel Motor Replace Reel Motor. 2. Check Reel Torque Offset [In case of abnormal condition] Re-adjustment --- Motor Torque Offset Adjustment 3. Check Reel Brake Solenoid (Check the Reel Brake is smoothly released in the Reel Torque Offset Adjustment mode.) [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Check System Control board (F2 board) Solenoid Drive circuit S_BRAKE_N, T_BRAKE_N --- Fig. 3 4. Check Reel FG Reel FG --- Refer to Reel FG Check 1 and Reel FG Check 2

S_FF/REW_TIMEOVER	Check the problem occurred at tape beginning or tape, or other portion.	1. Check Reel FG Reel FG --- Refer to Reel FG Check 1 and Reel FG Check 2 [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Reel FG Sensor, Reel Replacement ● Check F1 board. 2. Check transparent tape detection. [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Replace sensors. ● Check F2 board. 3. Check the tape is not bent.
S_REEL_ROTA_TOO_FAST		1. Check Reel FG waveform. Reel FG --- Refer to Reel FG Check 1 and Reel FG Check 2 [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Reel FG Sensor, Reel Replacement ● Check F1 board. 2. Check Reel Drive circuit. TP450 and TP451 on F1 board --- less than 0.4 V

T_REEL_ROTA_TOO_FAST		1. Check Reel FG waveform. Reel FG --- Refer to Reel FG Check 1 and Reel FG Check 2 [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Reel FG Sensor, Reel Replacement ● Check F1 board. 2. Check Reel Drive circuit. TP450 and TP451 on F1 board --- less than 0.4 V
T_REEL_TORQUE_ERROR		1. Check Reel Torque Offset [In case of abnormal condition] Re-adjustment --- Motor Torque Offset Adjustment 2. Check Reel Brake Solenoid (Check the Reel Brake is smoothly released in the Reel Torque Offset Adjustment mode.) [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Check System Control board (F2 board) Solenoid Drive circuit S_BRAKE_N, T_BRAKE_N --- Fig. 3

S_REEL_TORQUE_ERROR		1. Check Reel Torque Offset [In case of abnormal condition] Re-adjustment --- Motor Torque Offset Adjustment 2. Check Reel Brake Solenoid (Check the Reel Brake is smoothly released in the Reel Torque Offset Adjustment mode.) [In case of abnormal condition] ● Check loosen of connector Mech I/F board, Mother board ● Check System Control board (F2 board) Solenoid Drive circuit S_BRAKE_N, T_BRAKE_N --- Fig. 3
DRUM_ROTATE_TOO_FAST		Check Cylinder PG Check Cylinder FG [In case of fast rotation] ● Check Cylinder flexible cable, connectors. ● Check CYL_ERR (TP400) voltage. Normal Rotation : TP400 = about 2.5 V During Full Acceleration : TP400 = 0 V EJECT mode : TP400 = 2.5 V Servo REF (IC207-2 pin) = about 2.5 V fix If above voltage is incorrect, servo board is not correct. [In case of FG is correct and PG is incorrect] PG signal flow is incorrect. (Cylinder >> Mech I/F >> Mother >> Servo)

DRUM_ROTATE_TOO_SLOW	Check that the tape is stick with the Cylinder. Check that the tape is stick with a part of the tape pass and it causes the high tension. In this case tape may brake the Cylinder rotation.	Check Cylinder PG Check Cylinder FG [In case of FG is correct and PG is incorrect] PG signal flow is incorrect. (Cylinder >> Mech I/F >> Mother >> Servo) [In case of both PG and FG are incorrect (Cylinder rotation is actually slow.)] (1) Check Cylinder Unit. Rotate the Cylinder in EJECT or UNLOAD condition. Check that the Cylinder smoothly rotate. If it is not smooth, the Cylinder unit is incorrect. (2) Check the rotary speed detection. Check that the CYL_FG_PRE (TP231) shows the pulse which is 4 pulses per rotation and the duty is 50 %, 0V/5V. If it is incorrect, FG signal flow is incorrect. (3) Check the Servo CPU outputs acceleration command. ● Check that acceleration voltage (less than 2.5 V) is output at CYL_ERR (TP400). ● Check that drive on signal which is 5 V at IC400-4 pin. when it is 2.5 V, it is OFF mode. (4) Check the Reference voltage. Check that SERVO_REF (IC207-2 pin) voltage is about 2.5 V. -→ If (3) or (4) is incorrect, surround circuit of CPU, D/A is incorrect. (5) Check that Power Supply voltage. Check that Drive IC voltage (VCC 5V : IC400-27 pin) and Motor Drive voltage CYL_VM (Q400 -1 or 8 pin). The VM is positive voltage during Cylinder ON. → If it is correct, between Motor Drive and Cylinder is incorrect. Check connectors of Cylinder, Mech I/F and Mother.

CAP_ROTATE_TOO_SLOW	Check the tape is not stacked with the tape pass and tension is not high. Check the mechanical load of Capstan.	Refer to Capstan FG check (1) and (2). ● In case of the Capstan Motor overrunning even the message is too slow. The FG signal which is used to detect capstan speed is not supplied to the SERVO CPU. Check the frequency at CAP_FG1,2 (TP80, 82) is correspond with the rotary speed. (about 1.58 kHz, 0/5 V in REC/PB mode). Check the connectors of Capstan, Mech I/F and Mother. ● In case of Capstan does not rotate. (1) Check the Servo CPU supplies the acceleration command. Check the SERVO_REF (IC207-2 pin) is about 2.5V. Check the CAP_ERR (TP401) is acceleration command. It is below than SERVO_REF voltage. If the capstan does not rotate, the CAP_ERR voltage should be 0 V. Check Drive ON signal (IC401 - 4 pin) i s 5 V (rev) and 0 V (fwd), 2.5 V (OFF). (2) Check the Power Supply voltage. Check the Drive IC power voltage (VCC 5V : IC401 - 27 pin). Check Motor Drive voltage CAP_VM (Q402 - 1 or 8 pin). (3) Check the Drive signal is supplied to Capstan motor. Check the connectors of Capstan, Mech I/F and Mother. If above conditions are correct, motor or drive circuit is incorrect.

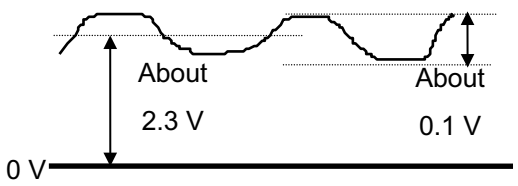
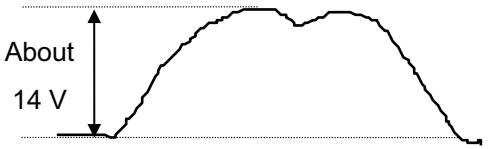
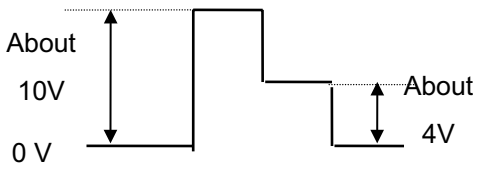
Fig 1 REEL Position Detect		Rotate the REEL motor in EJECT mode and check the following waveform. F1 board P2 - 10a TRH1+ 10b TRH1- 10c TRH2+ 11a TRH2- 11b TRH3+ 11c TRH3- 12c SRH1+ 13a SRH1- 13b SRH2+ 13c SRH2- 14a SRH3+ 14b SRH3-
Fig2 REEL Drive Waveform		Select T or S_REEL_TRQ on the Service menu(Servo Adjust) and rotate the REEL and confirm the following waveform is like Fig. 2. F1 board P2-23b TRM3 23c TRM1 24c TRM2 25b SRM3 25c SRM1 26c SRM2

Fig. 3 Brake Solenoid		Select T or S_REEL_TRQ on the Service menu(Servo Adjust) and check the waveform like Fig. 3 appears at following positions at Brake is released. ● T_REEL_TRQ selection F2 board P2 -25C T_BRAKE_N ● S_REEL_TRQ selection F2 board P2 -23C S_BRAKE_N